CS 550/150RC

Spreader And Joystick Controller Calibration Manual

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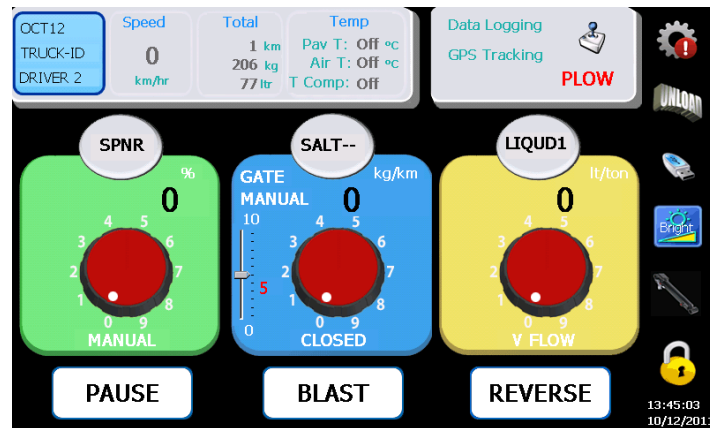
1   Programming Mode

All symbols on the right of the screen require a tap and hold for >1 second.

Press ⬛ symbol to enter into programming mode.

Note: A valid PROGRAMMING USB key must be on the USB port. The PROGRAMMING USB key is for programming and log data, and the LOG DATA USB key will only retrieve data.
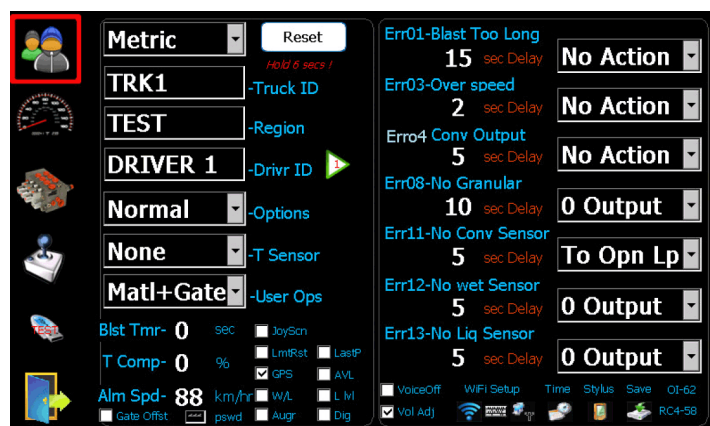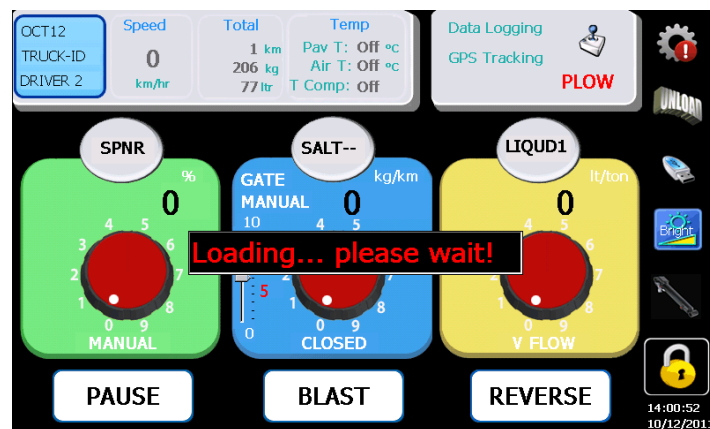
2   Program Screen Layout

Note: Due to the compact nature of these screens, the use of a selection tool like a pen or stylus is recommended.
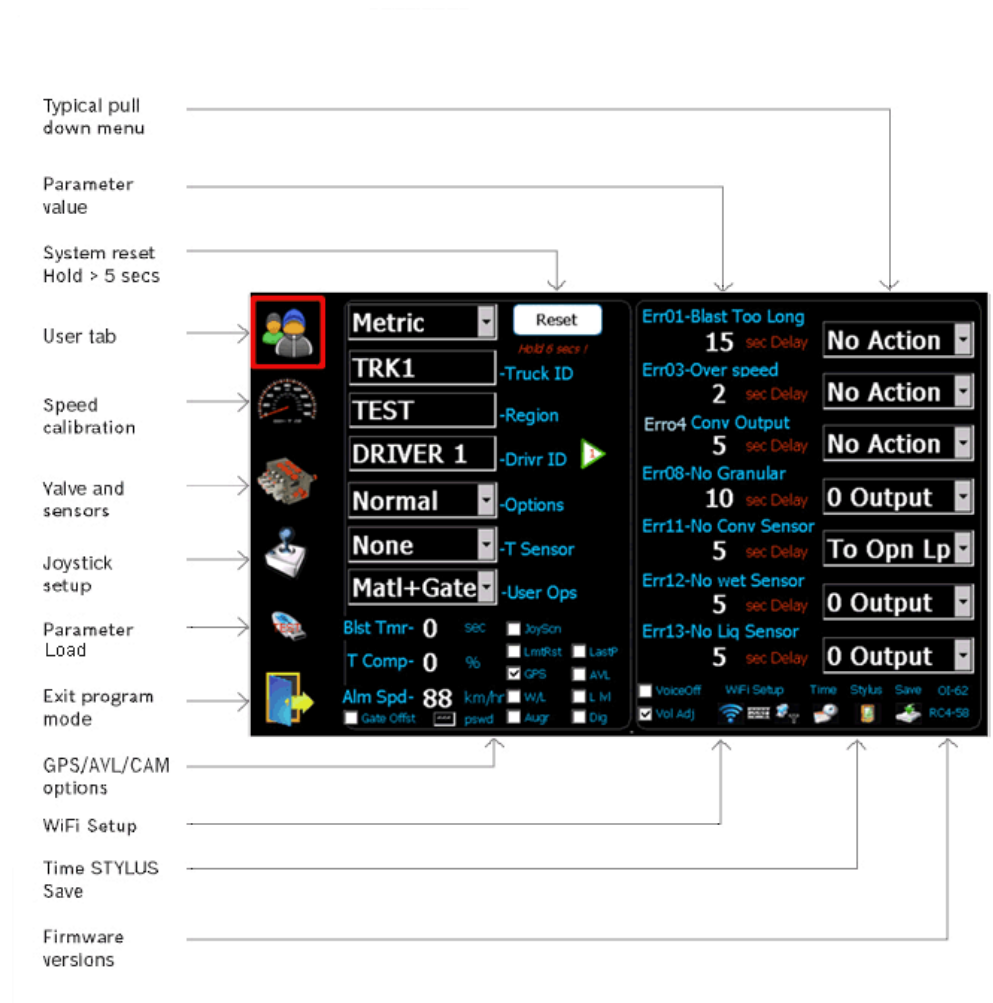
3   Changing Fields

Note: Due to the compact nature of these screens, the use of a selection tool like a pen or stylus is recommended.

When selecting an item without a pull-down selection menu, a keypad is required. This keypad is used to enter text or numeric values. The example shown is "TRUCK-ID".
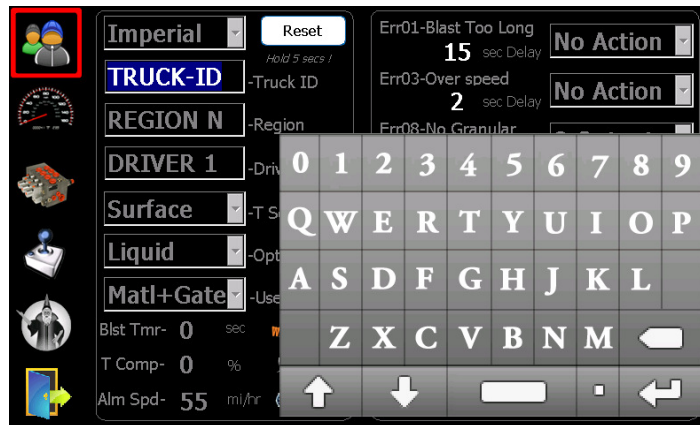
4 Initial Set-up

1. Set the units to imperial (LBS/Mile) or metric (Kg/Km).
2. Set the TRUCK ID.
3. Set the REGION NAME.
4. Set the DRIVER ID (optional), 4 driver IDs allowed.
5. Set the type of Temperature Sensor (optional).
6. Set the Options – see Advanced Features on page 13 (optional).
7. Set the items that the user has access to(optional).
8. Set Blast Timer, 0-timer disabled (optional).
9. Set Temp Compensation % based on 3 degree change (optional).
10. Set the vehicle speed alarm (optional).
11. Select AVL or GPS tracking (optional).
12. Set WIFI/TIME/STYLUS (if required).
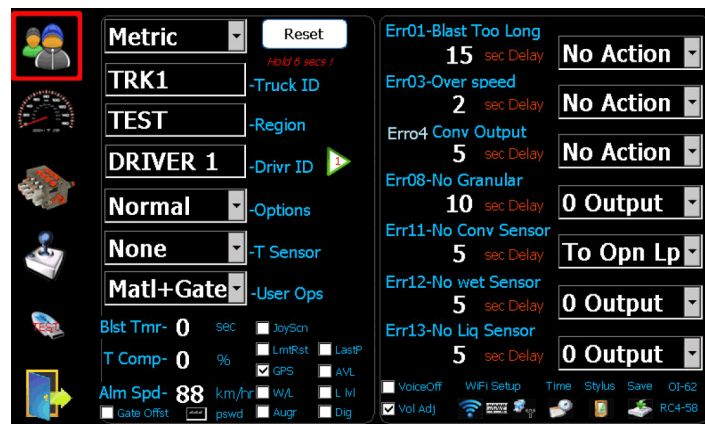
The default error configuration values will work well for most applications, no changes required.

Note: Save only applies to changes to Date/Time+WiFi+Stylus.

5   Ground Speed Calibration

1. Select ![icon] symbol to enter into the ground speed calibration screen.
2. Choose which calibration option best suits your situation.
3. Follow the instructions on the screen.
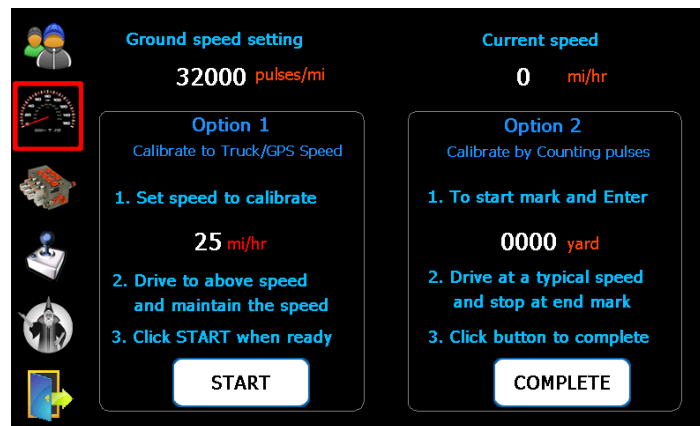
4. Press Start when the vehicle speed is steady.
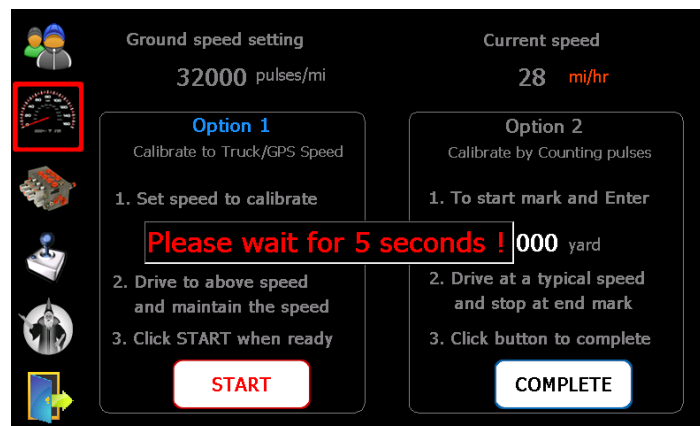
5. Once calibration is complete, verify the speed by driving the vehicle through its speed range and verify if the controller matches the speedometer.

6   Valve Nulling – Conv/Spn/Prewet/Norm

1.   Select ![icon] symbol to enter into the calibration screen.
2.   Select the appropriate mode:
   Spinner – Manual (*default*)
   Conveyor/Auger – Manual, Open, Closed (*default*)
   Prewet – Fixed, V-Flow (*default*), Manual, Manual-SPD, Return Oil
   Gate – Manual (*default*), Read Back, Auto
   Norm (Anti-icing) – Off (*default*), 1 Boom, 3 Boom, Manual
3.   Set correct conveyor sensor pulses/rev if Closed loop is selected.
4.   Ensure the hopper is empty, and the truck is safe to operate.
5.   Start the engine to achieve adequate oil flow.

If the Closed loop mode is selected for **Conveyor**, V-Flow or Return Oil mode for **Prewet, and** 1Boom or 3 Boom is selected for **Norm** (Anti-icing) it is strongly recommended to run **Auto Null**. For manual mode please skip **6.1** and follow **6.2** Manual Nulling instructions.

6.1   Auto Nulling
1.   Press "Auto Null" to start. This procedure automatically run the system, and set both "Min" and "Max" for the motor selected, Auger, Prewet, Anti-icing, etc...).
2.   Note: This feature can only be used with motors with speed or flow feedback (i.e. Conveyor/ Auger, Prewet, Anti-icing, etc.).

6.2   Manual Nulling
1.   Press "Min" value field to enter into edit mode.
2.   Use up and down arrows to adjust speed so that the motor just begins to turn
3.   Press the "Min" value field again to end the edit mode and accept the value
4.   Do the same for "Max" except adjust the motor to a safe maximum speed or until the RRM readout stops to increase.

5. Forward Gain and Blast settings can also be adjusted
6. Repeat this procedure for all the vehicle motors (i.e. Conveyor/Auger, Spinner, Prewet, Anti-icing, etc.).
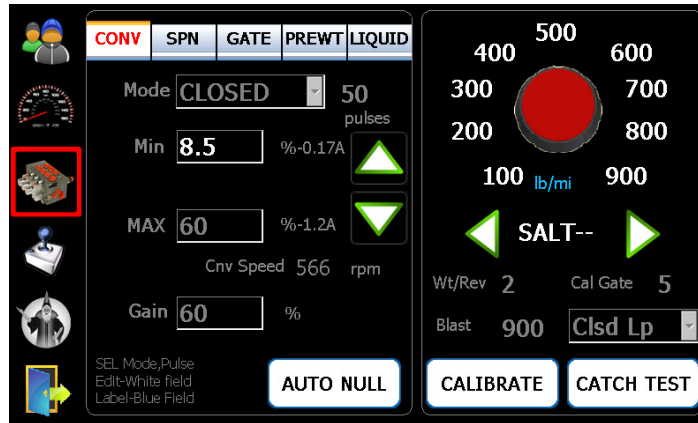
7 Gate Calibration

1. Select the Gate tab.
2. Select the appropriate mode of gate operation :

Manual - Enter max height, and no further calibration required.

Read back - Press **High** value field to enter into edit mode

   - Move the gate to its max opening
   - Press **High** value field to end mode and save the value
   - Repeat the same procedure for **Low** value

   Note: A Gate Position Sensor required for Read back.

Auto - Press **High** value field to enter into edit mode

   - Press Up/Down buttons to move the gate to max opening
   - Press **High** value field to end mode and save the value
   - Repeat the same procedure for **Low** value

   Note: A gate cylinder with a position Sensor required.
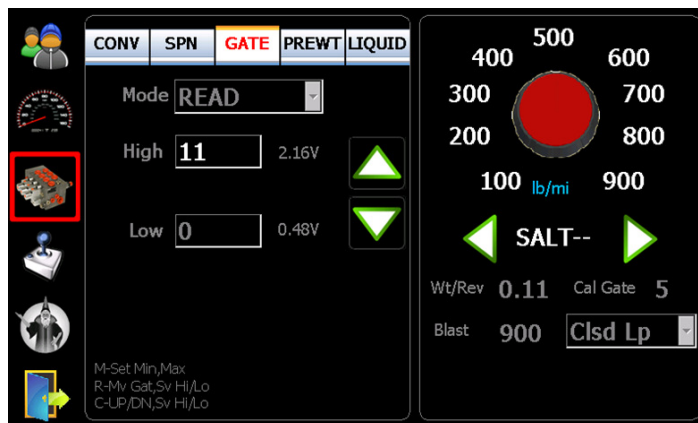
8   Material Calibration

Solid Material Calibration

1. Tap on the "valve" symbol and CONV tab to enter into solid calibration.
2. Place an adequate catch container under the spreader discharge chute.
3. Make sure that sufficient material in the hopper and the system is safe to run.
4. Set gate position:
    Manual - Change CAL Gate to match actual gate position
    Readback - Adjust actual gate position on the truck
    Auto - Set to a desired gate position for calibration
5. Press "CALIBRATION" button to proceed.
6. Turn CONV Knob and/or SPN Knob to run.
7. Stop when desired amount is reached.
8. Weigh the material and enter the value.
9. Press "CALIBRATION" Button to complete.

Note: Press "STOP" button to stop the process anytime during calibration.
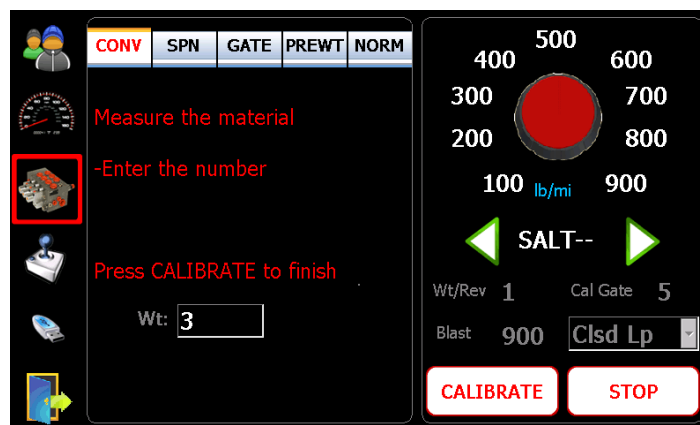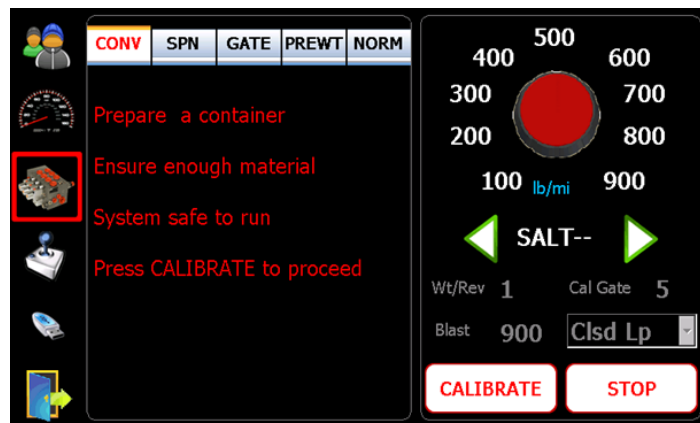
Liquid Material Calibration (Prewet or Anti-icing)

1. Tap on symbol and **PREWET/NORM** tab to enter into liquid calibration.
2. Place an adequate catch container under the liquid spray nozzle.
3. Make sure that sufficient liquid in the tank and the system is safe to run.
4. Press "CALIBRATION" button to proceed.
5. Turn PREWET Knob to run.
6. Stop when desired amount is reached.
7. Measure the liquid volume and enter the value.
8. Press "CALIBRATION" Button to complete.
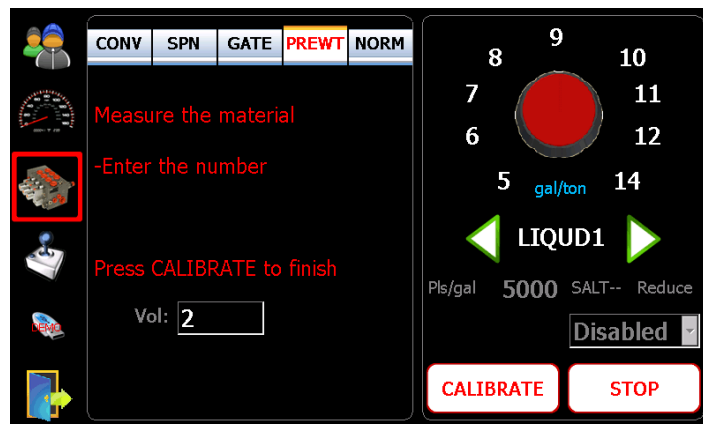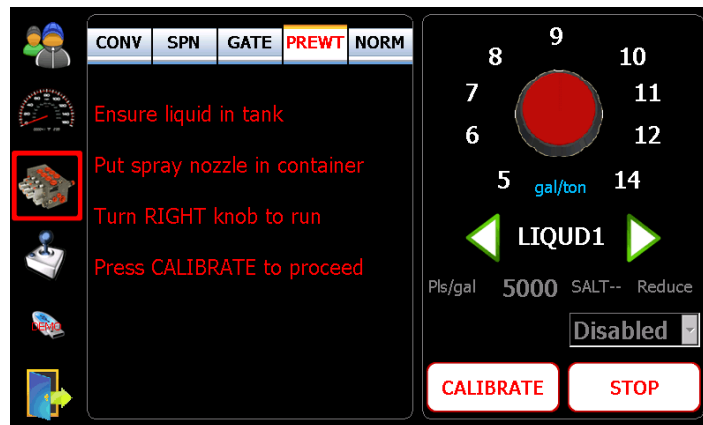
9   Material Catch Test

1. Tap on [symbol] symbol to enter into the material calibration screen.
2. Place an adequate catch container under the spreader discharge chute.
3. Press "CATCH TEST" button to start, and enter the desired rate, speed and duration (seconds) using on-screen keypad.
4. Press "CATCH TEST" button to begin material dispensing (hydraulics must be active).
5. When dispensing is stopped, weigh the material and enter the value.
6. Press "CATCH TEST" button again to end.
7. An appropriate weight per revolution will be calculated and displayed on the bottom right of the screen.
8. Repeat this procedure for all solid materials (use the green left and right arrows to select material types).
9. The individual rates can be adjusted by tapping the rate and editing the value with the keypad.
10. These same procedures apply to pre-wet and liquid.

Note: The material names can be changed by tapping on the text "SALT - -" and using the keypad to edit.
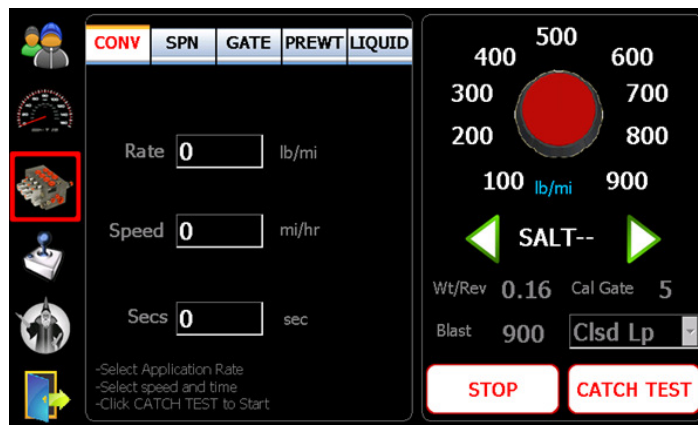
10 Load Parameters

The operation requires an USB PROGRAM key. It allows end users to load parameters from an existing file on the USB stick.

1. Ensure an USB PROGRAM key inserted
2. Tap on USB symbol.

3. Select a file to load from the popup file window.
4. Click on the "Select" or "Cancel" button to select or cancel.
   Then the popup file window would close, and red "Load" text shows up on the USB symbol if a file is selected.
5. Tap on the Door Symbol to exit to the operation mode.
6. Turn the unit off, and on again for the new parameter to take effect.
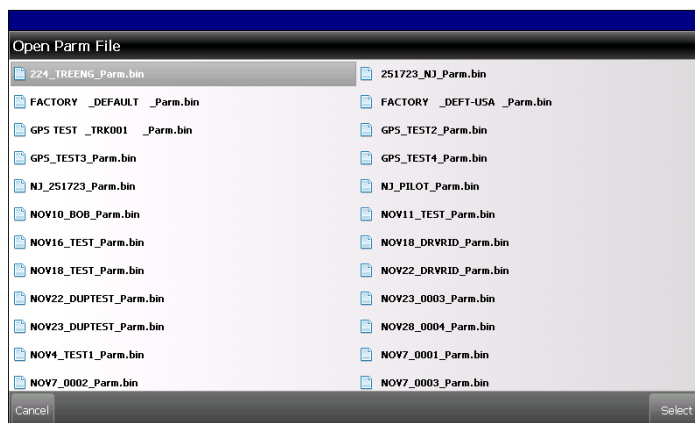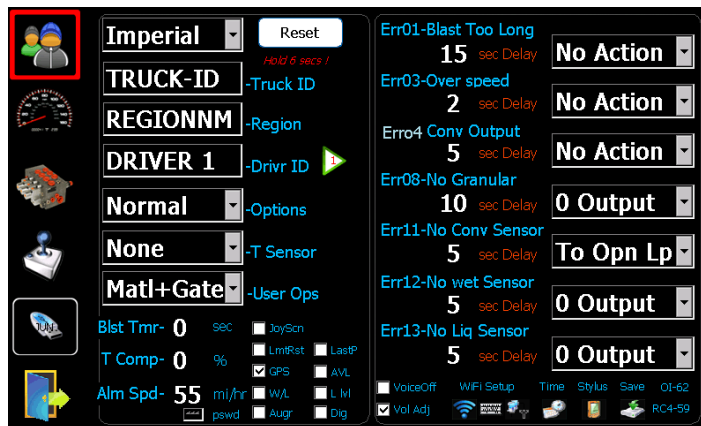
11 Advanced Features

Tap on [icon] symbol to enter into the user calibration screen. This series of drop-down menus allow the adjustment of special features of the 550 system.
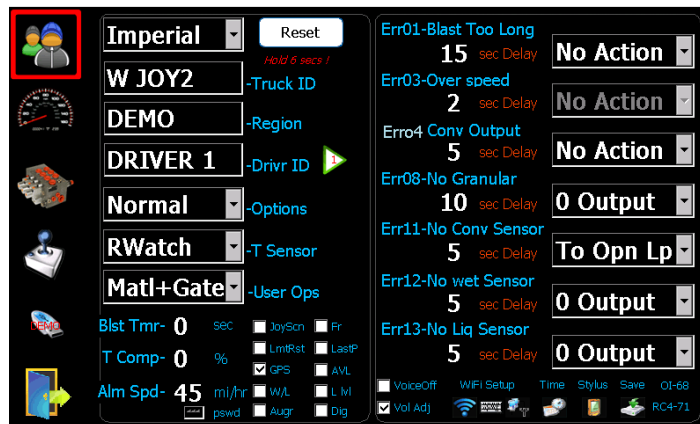
System Reset – Press and hold the preset button for 5 seconds.

WARNING: All parameters will be reset to factory defaults.

Temperature Sensors – Roadwatch, Surface Patrol
System Options – Normal, Pattern, Air Gate, Liquid+, Cross Conv
User Options – MATERIAL and or GATE (operators allowed to adjust without a programming key).
Blast Timer – Blast turns off automatically when time out
Speed alarm – alarm will sound when the set speed is exceeded.
Temp Comp – Temp compensation, per three degree change

JoyScn – Operator screen defaults to joystick screen.
LmtRst – Dump limit warning disappears once acknowldged
GPS/AVL – GPS tracking, require a serial cable (R987376776) and a GPS receiver Puck (R987380745), or AVL interface.
W/L – Prewet and Anti-icing operation interlock with an asymmetrical valve
L lvl – Use MAT change input as liquid level detection.
Fr – French version
Auger – Once checked the gate change is disabled
LastP – Remember the last knob positions at power up.
Dig – Disable remote Pause/Blast, and use them as digital inputs

VoiceOff – Turn off voice readout for spreader functions.
VolAdj – Allow operators to adjust volume without programming key

12   WiFi and GPS Tracking

If equipped with WiFi option make sure an internal or external antenna is connected before setting it up. Similar to standard PC there are two parts that need to be set up, Wireless Connection and Network Settings.

Wireless Connection: Setting up connection to a router/access point. This is very similar to setting up a WiFi connection of a PC. A network profile needs to be set up to allow a 550 controller to connect to the network. Appropriate security protection is recommended for the router and the 550 controller.
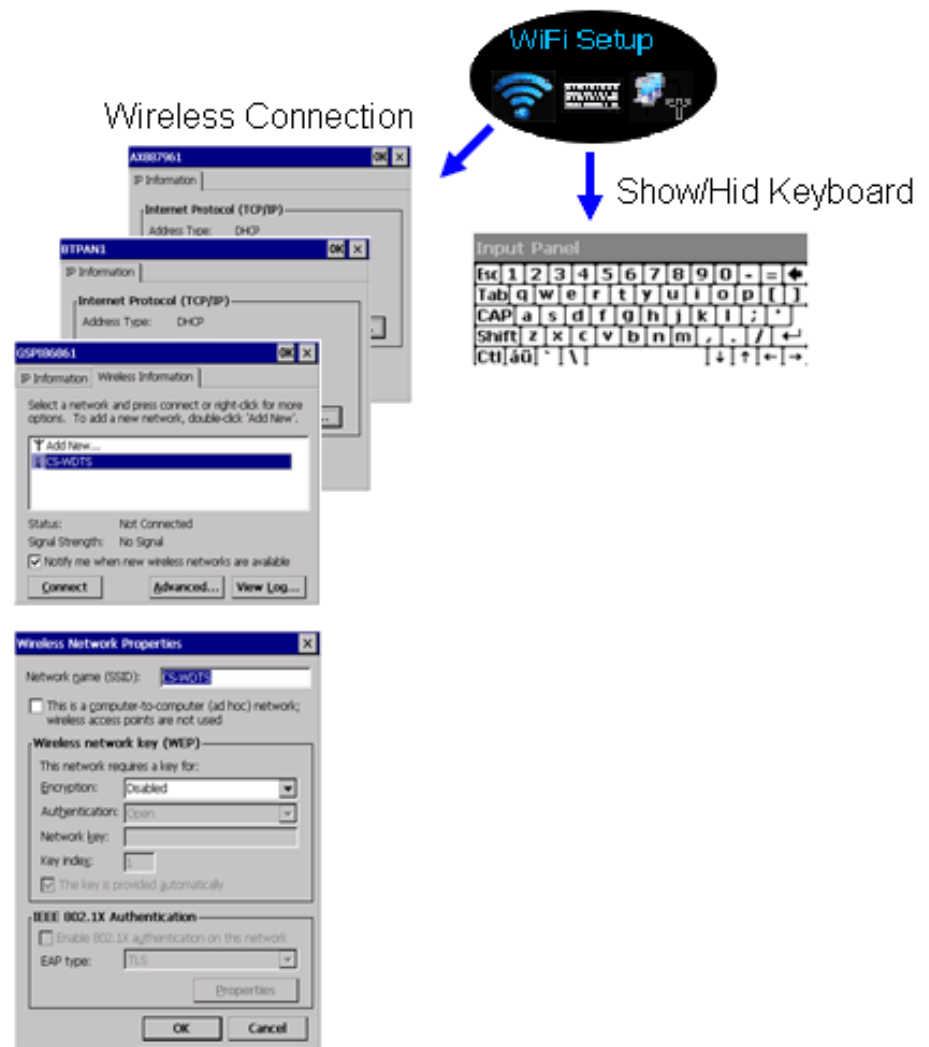
Network Setting: A static IP Address needs to be assigned for the 550 PC WiFi software to communication with a CS5550/150 unit.
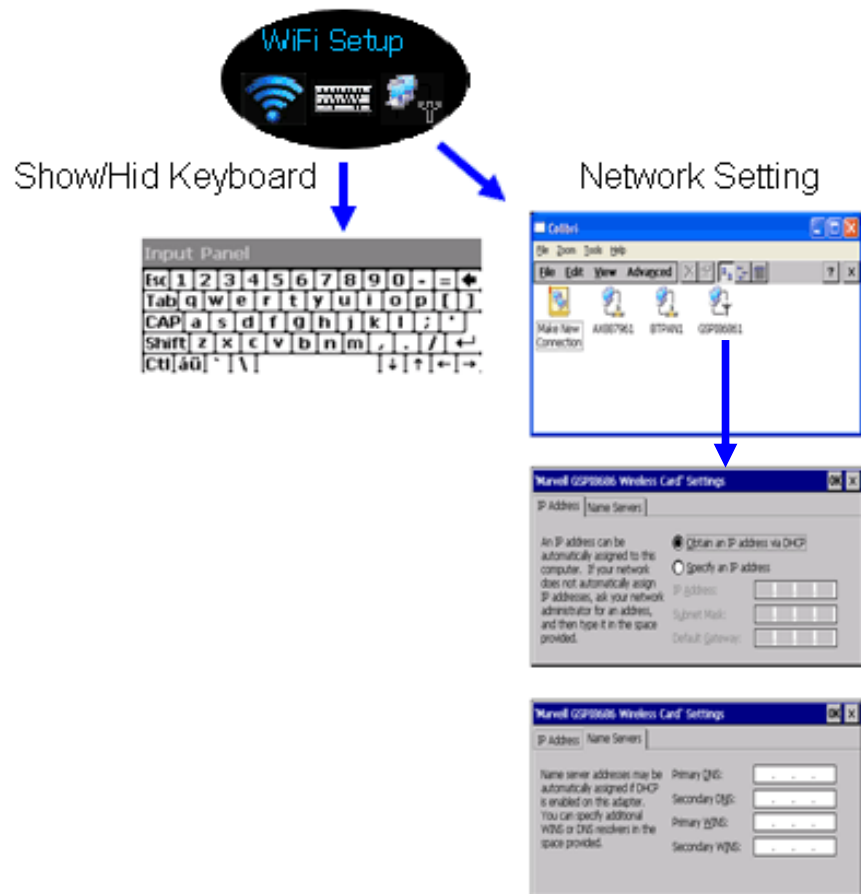
GPS Tracking: For 550 controllers it is easy to enable the GPS tracking option by simply connecting a GPS receiver to the display unit. Here are the part numbers for the cable and the GPS receiver puck:
R987376776, 550 Serial cable for GPS and Temp sensor
R987380745, GPS receiver

13 Optional Modes and Operation

13.1 Pattern Mode - Chute Control

This mode requires a hydraulic valve and a hydraulic cylinder. It controls the direction of a chute by moving the chute LEFT or RIGHT on the operator screen.

1. Select the **Pattern** mode under "Options" menu from USER screen.
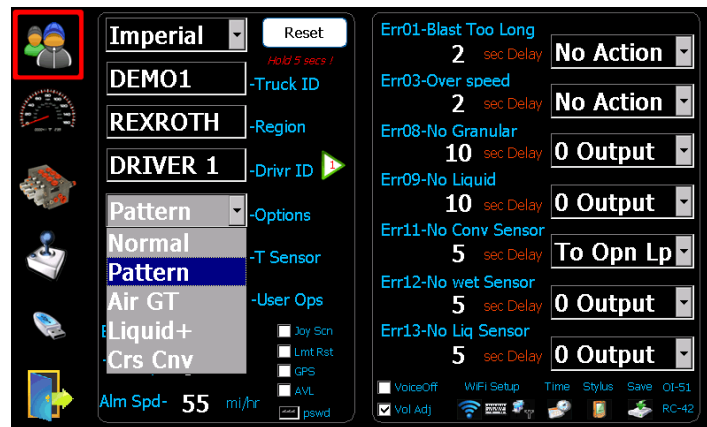
2. Click 'L' and 'R' buttons on operator screen to move chute to the Middle position
3. Click on the value of 'Chute-%' to record the position with an USB PROGRAM key inserted into USB port.
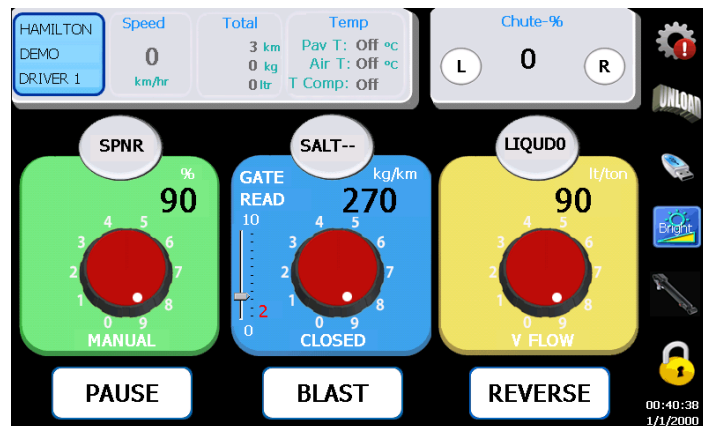
13.2 Air Gate Mode

This mode allows a two position gate control with an air cylinder for two different materials, like SAND and SALT. It provides a digital output signal (0, 12V) to toggle between two materials and two calibrated gate positions. When gate

position changes the 550 controller also automatically set the gate position to the correct calibrated gate position for the material.

1. Select the **Air Gate** mode under "Options" menu from USER screen.
2. Click buttons on operator screen to turn on/off Air Gate.
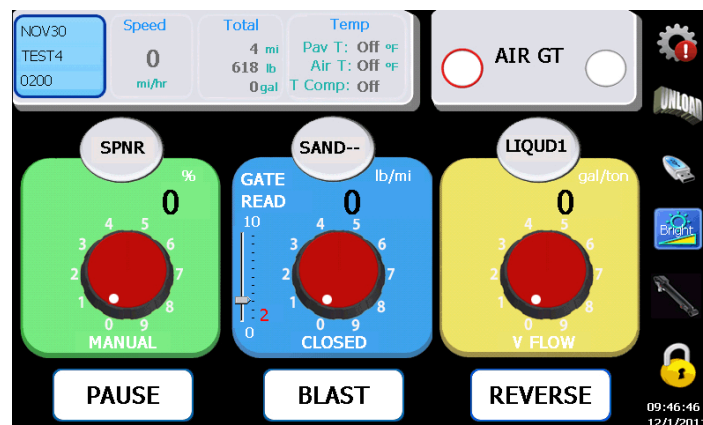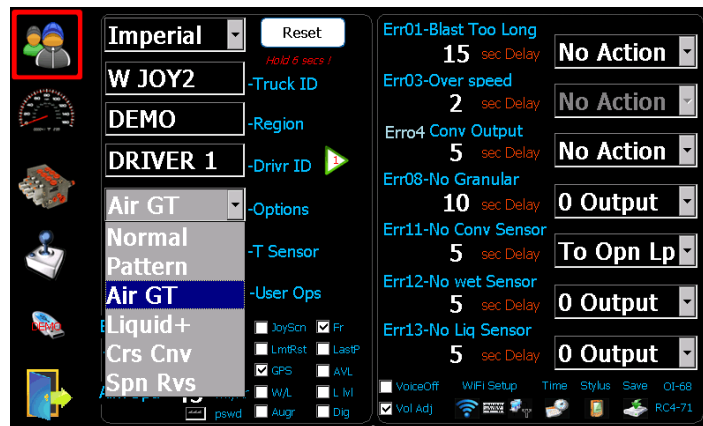
13.3 Liquid+ Mode (Solid+Prewet+3 Boom Anti-ice)

This mode allows a 550 controller to run both Solid, Prewet and Anti-icing operations simultaneously on a single screen.

1. Select the Liquid+ under "**Options**" menu from the USR screen.
2. Click on Valve icon and then click on **LIQ+** tab, and select "3 BOOM".
3. Set the min and max value as defined in the valve nulling procedure (on page 8).
4. Calibrate all Prewet and Anti-icing materials to be used.
5. Click **L, C, R** buttons on operator screen to turn on/off each boom.
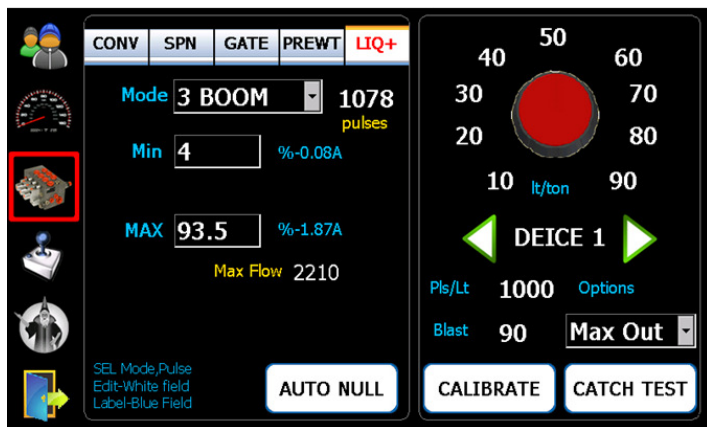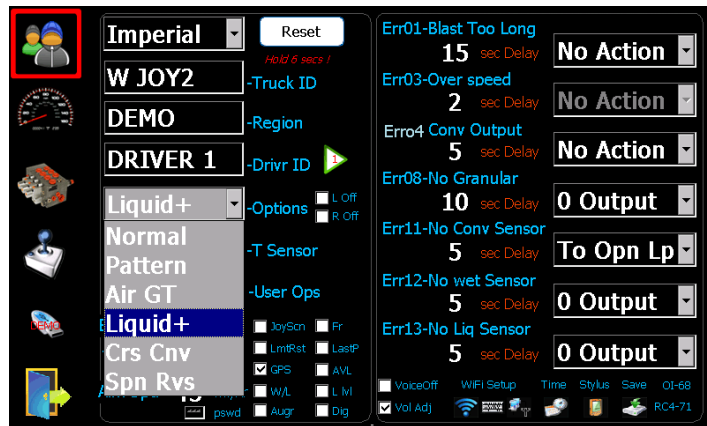
13.4   Cross Conveyor

This mode provides a proportional output and two digital outputs (Metric), and or two proportional outputs (Imperial) to manually control a Left and a Right cross conveyor.

1. Select the **Crs Conv** under "Options" menu from the USER screen.
2. Click on Valve icon and then click on **C CNV** tab.
3. Set the min and max values as defined in the valve nulling procedure (page 8).
4. Select left/right cross conveyor, click up/down buttons to adjust speed.
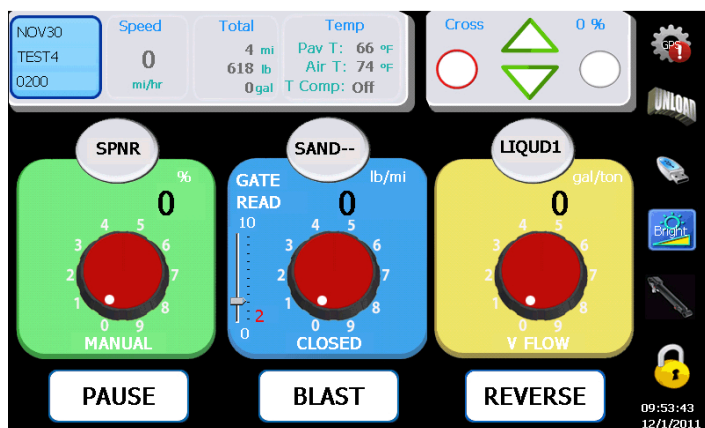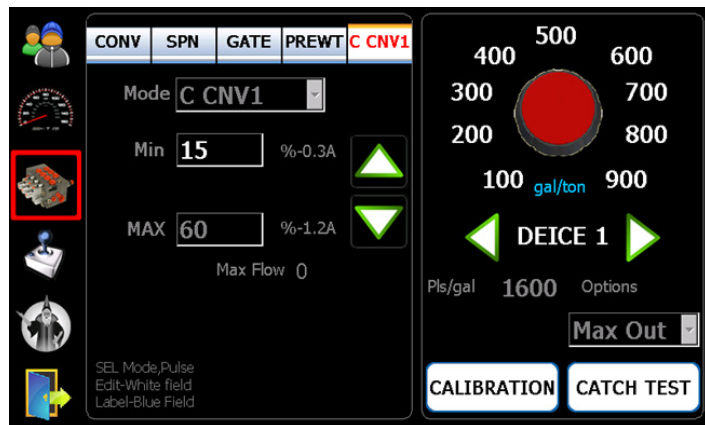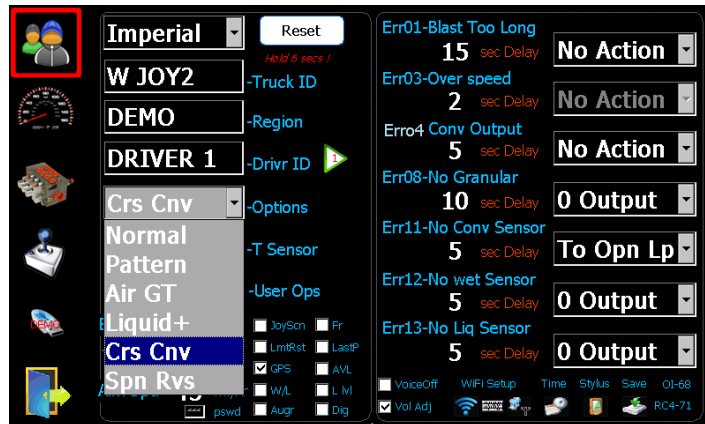
13.5   Spinner Reverse Mode

This mode allows end users to control a Spinner in either forward or reverse direction by providing two proportional spinner outputs. When an operator click on the **R** button to reverse the spinner direction the controller ramps down from the current direction and ramps up to the opposite direction.

1. Select the **Spn Rvs** under "Options" menu from the USER screen.
2. System assume the same Min&Max for Spinner reverse output
3. Click 'R' button to select spinner forward or reverse operation
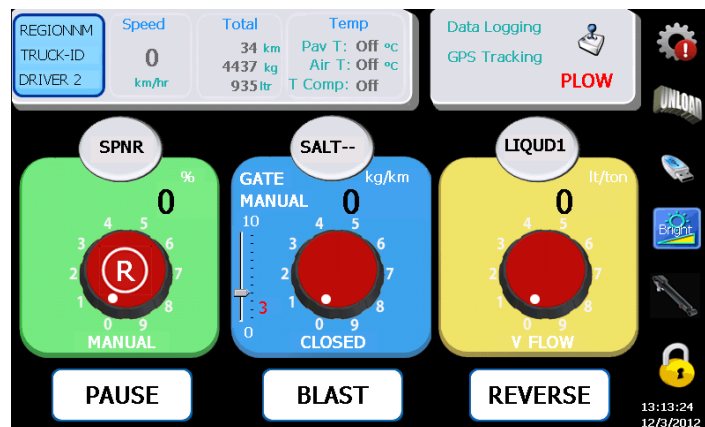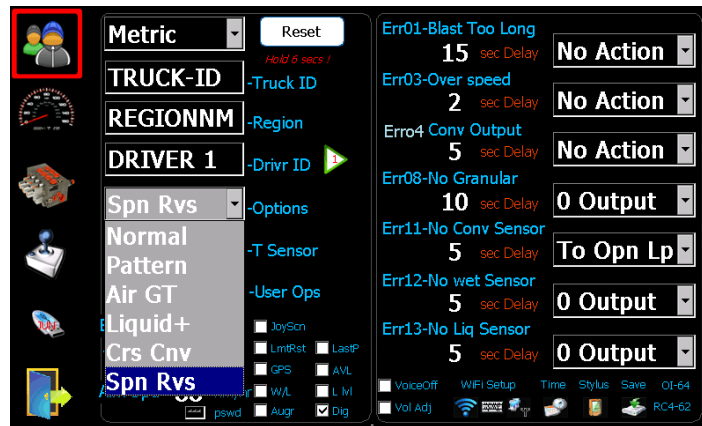
13.6   Solid Reduction for Pre-wet

This feature helps to save salt usage when prewet is turned on. End users are able to define a percentage of salt rate reduction in material configuration.

1. Select the **Prewet** tab.
2. The pull-down menu for solid reduction percentage is in the bottom right of the screen (i.e. 10%, 15%, 20%, 30%)
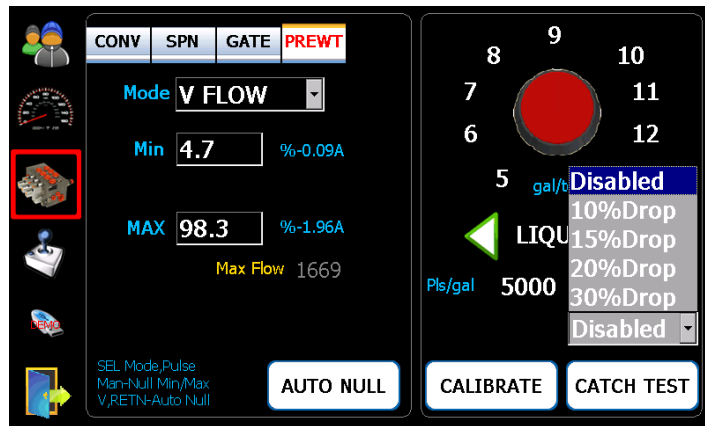
13.7   Dedicated 3 Boom Anti-ice

This mode sets the 550 controller to a dedicated Anti-ice controller. Since this mode selection may require some IO re-initialization the controller needs to be turned off, and turned back on.

1. Select **Norm** under the "Options" menu from the USER screen.
2. Click on Valve icon and then click on **NORM** icon, and select "3 BOOM".
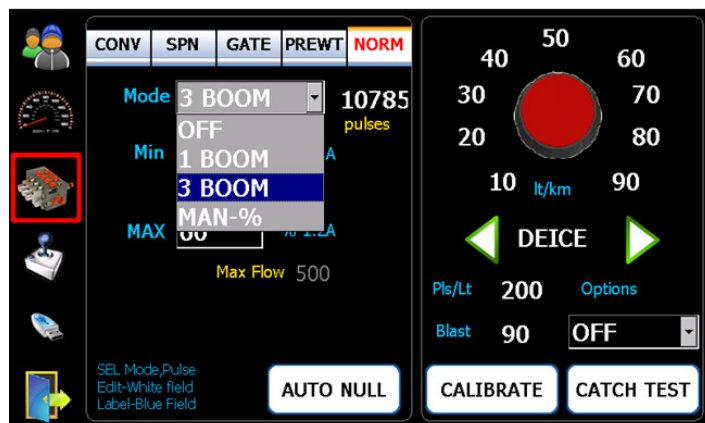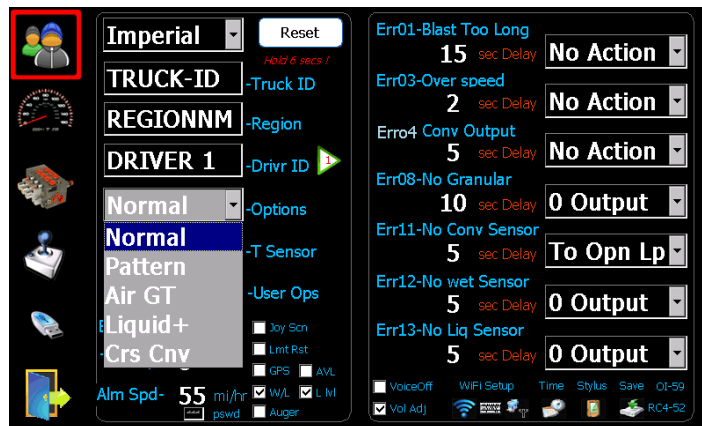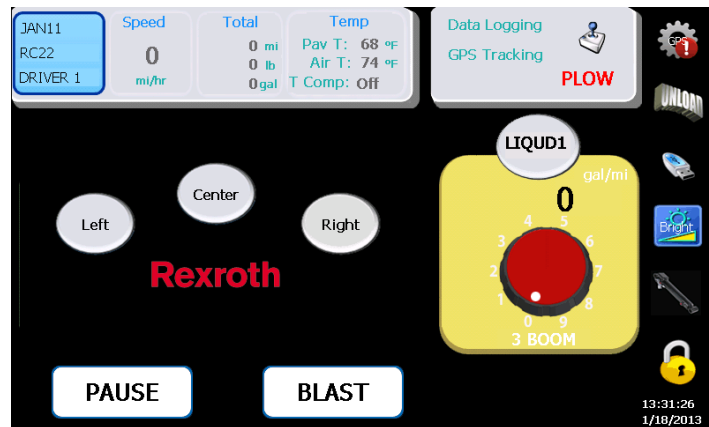
14 Optional Modes & Operation– 550Lite

The 550 Lite is a cost effective version of standard 550. It supports the following optional functions:

Liquid – Anti-icing

Reverse – Same as the standard 550 Reverse function

GS12V – Enable a ground speed triggered digital output for custom use

Air Gate – Same as standard 550**,** see 13.2 on page 17

Spn Rvs – Same as standard 550, see 13.5 on page 21

Only one of the above functions can be configured for the system.

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14.1 Liquid – 1 Boom Anti-icing

This mode allows Conveyor, Spinner, Prewet and Anti-icing to run simultaneously.

1. Select the **Liquid** mode under "Options" menu from USER screen.
2. Click on Valve icon and then click on NORM icon, and select "3 BOOM".
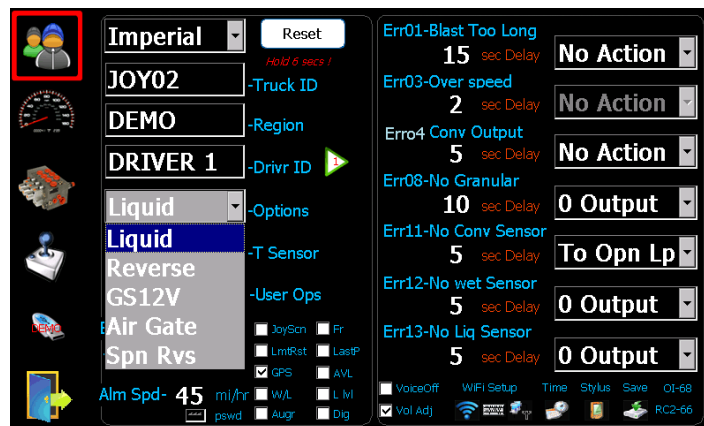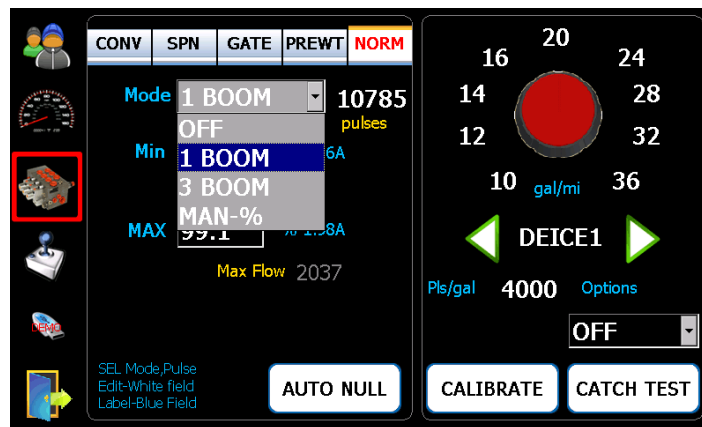
3. Press Up and Down buttons on operator screen to adjust Anti-icing rates
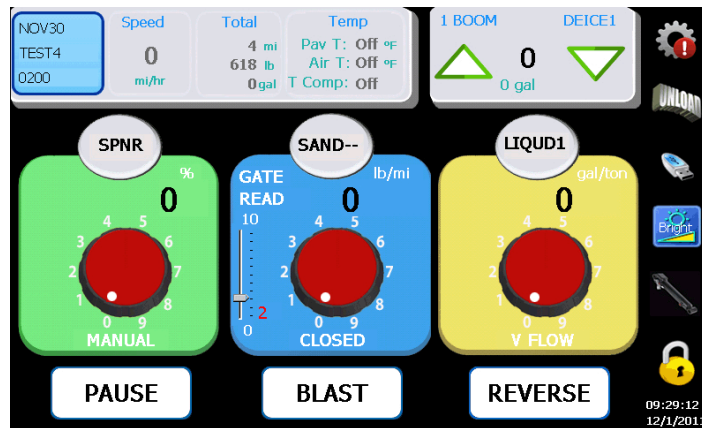
14.2 Liquid – Dedicated 3 Boom Anti-icing

Same as the standard 550, see **13.7** on previous page.

14   Error Codes

The following error messages are user configurable, both timeouts and controller actions.

Error Description	#	Suggested Solution
ERROR_BLAST_TOO_LONG	1	Turn off blast/time too short
ERROR_DEICE_BLST_TOO_LONG	2	Turn off blast/time too short
ERROR_OVERSPEED	3	Slow down or raise gate
ERROR_SPIN_PROP	4	Check cables, replace coil
ERROR_CONV_PROP	5	Check cables, replace coil
ERROR_CROSS1_PROP	6	Check cables, replace coil
ERROR_CROSS2_PROP	7	Check cables, replace coil
ERROR_NO_MATL_DETECT	8	Load material, check sensor
ERROR_NO_LIQ_DETECT	9	Load material, check sensor
ERROR_NO_GROUNDSPEED	10	Check cable/sensor
ERROR_NO_CONVEYOR	11	Check cable/sensor
ERROR_NO_LIQUID	12	Check cable/sensor
ERROR_NO_DEICE	13	Check cable/sensor

The following Errors are warning messages, and not user configurable.

Error 20 - Output Non-Zero. This is a safety function to prevent the controller from accidentally sending an unexpected output when the controller is turned on, or when the user leaves programming mode and enters normal operation mode. The outputs will be kept at zero until the error condition is removed. To recover, set the application rates to zero or exit Blast mode.

Error 21 - Unload Not Allowed. An attempt was made to enter Unload mode while the truck was moving, which is not allowed. The Unload command will be ignored in this case.

Error 22 - BB3 System Error. This is an unrecoverable error in the RC controller. Try rebooting the controller to see if it goes away, otherwise report the failure to Bosch Rexroth. This error can also occur if an attempt is made to run a joystick without having an RCE controller present.

Error 23 - This is a communication failure between the RC controller and the display. It will show up in the logging history in the RC controller after the display is re-connected.

Error 24 - RCE communication failure. This is a communication failure between the RC controller and the RCE controller in a system with a joystick. It will automatically shut down the joysticks. The status of this communication can also be monitored using the display item called DIG which is available by double-tapping on the gear icon while in normal operation mode. The item called DIG at the bottom right corner of the display should normally be zero. It will be E0 if this error occurs.

Error 25 - Joystick 1 communication failure. This will shut down the joystick outputs, and will show up as a 40 in the live DIG display item.

Error 26 - Joystick 2 communication failure. This will shut down the joystick outputs, and will show up as a 80 in the live DIG display item.

Error 27 - No Gate Sensor. Gate sensor failure, most likely caused by cable break. This will force the gate control into Manual.

Error 28 - Gate Position is Zero. This will occur only if the gate position is zero while in gate read-back mode. The conveyor will not be allowed to move until this is fixed.

Error 29 - No Ground Speed Simulation. This is just an information message to indicate that ground speed simulation mode has been stopped.

Error 30 - Under-Application: Spinner. The spinner cannot meet the desired RPM setpoint. This should not happen in manual mode, but could happen if the spinner is in PPS mode and the ground speed is high.

Error 31 - Under-Application: Conveyor. The conveyor cannot meet the desired RPM setpoint. Caused by too high application rate or too high ground speed or incorrect calibration.

Error 32 - Under-Application: Pre-Wet. The pre-wet pump cannot meet the desired flow setpoint. Caused by too high application rate or too high ground speed or incorrect calibration.

Error 33 - Under-Application: Anti-Ice. The anti-ice pump cannot meet the desired flow setpoint. Caused by too high application rate or too high ground speed or incorrect calibration.

Error 34 - Over-Application: Conveyor. The solid application rate is above setpoint. Most likely caused by a minimum null value for conveyor output that is too high, so the conveyor never stops.

Error 35 - Over-Application: Pre-Wet. The pre-wet application rate is above setpoint. Most likely caused by a minimum null value for the pre-wet pump output that is too high, so the pump never stops.

Error 36 - Over-Application: Anti-Ice. The anti-ice application rate is above setpoint. Most likely caused by a minimum null value for the anti-ice pump output that is too high, so the pump never stops.

Error 37 - Calibration: Ground-Speed Pulses Too Low. Calculated pulses per km is too low during calibration. Possibly caused by no sensor feedback, or try recalibrating the ground speed sensor.

Error 38 - Spinner Maximum RPM Too Low. During auto nulling, the calculated maximum RPM was too low, most likely caused by no sensor feedback.

Error 39 - Conveyor Maximum RPM Too Low. During auto nulling, the calculated maximum RPM was too low, most likely caused by no sensor feedback.

Error 40 - Pre-Wet Maximum Hz Too Low. During auto nulling, the calculated maximum Hz was too low, most likely caused by no sensor feedback.

Error 41 - Anti-Ice Maximum Hz Too Low. During auto nulling, the calculated maximum Hz was too low, most likely caused by no sensor feedback.

Error 42 - Wrong Spinner Control Mode. An attempt was made to perform auto nulling of a spinner while it was in manual.

Error 43 - Wrong Conveyor Control Mode. Not Used.

Error 44 - Wrong Pre-Wet Control Mode. An attempt was made to perform auto nulling, or volume calibration, of a pre-wet pump while it was in manual.

Error 45 - Wrong Anti-Ice Control Mode. An attempt was made to perform auto nulling, or volume calibration, of an anti-ice pump while it was in manual. This error could also be caused by an I/O conflict between a cross conveyor mode and the anti-ice pump output, in which case the anti-ice pump will be disabled.

Error 46 - Wrong Cross-Conveyor Mode. An attempt was made to go into Reverse while this output was being used by a cross-conveyor mode. The Reverse command will be ignored in this case. Could also be caused by attempting to use gm/sq.m. mode while there was an I/O conflict with a Cross-Conveyor CA mode, in this case gm/sq.m. mode will not be allowed. Could also be caused by attempting to use closed-loop gate control while in Cross-Conveyor US mode or Liquid-Plus mode, in which case the gate control will be forced into gate readback mode.

Error 47 - Wt. per Revolution Too Low. During conveyor weight calibration, the calculated weight per revolution was too low, most likely caused by typing in zero for the weight.

Error 48 - Wt. per Revolution Too High. During conveyor weight calibration, the calculated weight per revolution was too high, most likely caused by no conveyor sensor feedback.

Error 49 - Pre-Wet Pulses per Gallon Too Low. During calibration of pre-wet volume output, the pulses/gal was too low, most likely caused by no flow sensor feedback.

Error 50 - Pre-Wet Pulses per Gallon Too Hi. During calibration of pre-wet volume output, the pulses/gal was too high, most likely caused by typing in zero for the volume.

Error 51 - Anti-Ice Pulses per Gallon Too Low. During calibration of anti-ice volume output, the pulses/gal was too low, most likely caused by no flow sensor feedback.

Error 52 - Anti-Ice Pulses per Gallon Too Hi. During calibration of anti-ice volume output, the pulses/gal was too high, most likely caused by typing in zero for the volume.

Error 53 - Spinner mm at zero RPM too Low. During calibration of the relationship between spinner RPM and spinner spread width, a value of 0 mm at zero RPM was used.

Error 54 - Spinner mm per RPM too Low. During calibration of the relationship between spinner RPM and spinner spread width, a value of maximum spread width was used that was less than the mm at zero RPM.

Error 55 - Gate Movement Too Low. During calibration of gate maximum and minimum position, the difference between minimum and maximum height was less than 1 inch.

Error 56 - Gate Zero in Manual. While in manual gate control mode, the operating gate position was specified to be zero.

Error 57 - Gate at Calibration Too Low. While calibrating the weight per revolution for a specific material, the gate position at calibration was specified to be zero.

Error 58 - Spinner PPR Too Low. A value of zero was used for spinner pulses per revolution.

Error 59 - Conveyor PPR Too Low. A value of zero was used for conveyor pulses per revolution.

Error 60 - Spinner Output Range Too Low. The difference between maximum and minimum spinner nulling values was less than 5%.

Error 61 - Conveyor Output Range Too Low. The difference between maximum and minimum conveyor nulling values was less than 5%.

Error 62 - Cross Conveyor 1 Output Range Too Low. The difference between maximum and minimum cross conveyor nulling values was less than 5%.

Error 63 - Cross Conveyor 2 Output Range Too Low. The difference between maximum and minimum cross conveyor nulling values was less than 5%.

Error 64 - Pre-Wet Output Range Too Low. The difference between maximum and minimum pre-wet nulling values was less than 5%.

Error 65 - Anti-Ice Output Range Too Low. The difference between maximum and minimum anti-ice nulling values was less than 5%.

Error 66 - Joystick 1 Output Range Too Low. The difference between maximum and minimum joystick nulling values for one of the six outputs was less than 5%.

Error 67 - Joystick 2 Output Range Too Low. The difference between maximum and minimum joystick nulling values for one of the six outputs was less than 5%.

Error 68 - Theoretical Maximum Conveyor RPM Too High. Based on the specified application rate setpoints, and the maximum ground speed, the maximum theoretical conveyor RPM required has been calculated to be more than twice the actual conveyor capacity, which will lead to serious under-application problems. The actual controller RPM setpoint will be clamped at this value to prevent the controller from becoming unstable, and the conveyor should be re-calibrated to determine the source of the problem.

Error 69 - Theoretical Maximum Pre-Wet Hz Too High. Based on the specified application rate setpoints, and the maximum ground speed, the maximum theoretical pre-wet pump flow required has been calculated to be more than twice the actual pump capacity, which will lead to serious under-application problems. The actual pump flow setpoint will be clamped at this value to prevent the controller from becoming unstable, and the pre-wet pump should be re-calibrated to determine the source of the problem.

Error 70 - Theoretical Maximum Anti-Ice Hz Too High. Based on the specified application rate setpoints, and the maximum ground speed, the maximum theoretical anti-ice pump flow required has been calculated to be more than twice the actual pump capacity, which will lead to serious under-application problems. The actual pump flow setpoint will be clamped at this value to prevent the controller from becoming unstable, and the anti-ice pump should be re-calibrated to determine the source of the problem.

15   Joystick Calibration

15.1   Solenoid Nulling

1. Start vehicle and achieve full pump flow.
2. Tap on   Joystick symbol.

3. Press "CALIBRATION" button and press a mode button on the
    joystick to select a desired mode to adjust.
4. Move the joystick slightly until the hydraulic actuator moves   slowly – press
    "Min" while the stick is deflected.
5. Move the joystick until the actuator moves at a safe maximum speed – press
    "Max".
6. Repeat this for all axis', directions and modes.

Press "CALIBRATION" button again to save all changes.
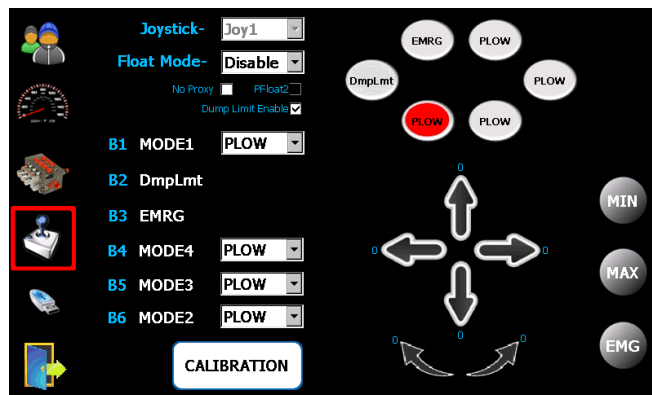
15.2   Emergency (Panic Button) – If Equipped

1. Select the desired mode on the joystick and pull the joystick in the direction that
    the emergency button should activate.
2. Press the round "EMG" button while the stick is deflected.

Any mode or direction can be assigned to Panic Button. In operation mode when the
Panic button is pushed in conjunction with the Deadman trigger, the selected
function(s) will activate simultaneously.

This joystick calibration is only required when a multifunction CANbus Joystick
Console is included with the system.

All the mode names and special functions will be configured by the factory. Only
solenoid nulling may be required.

16 Advanced Joystick Set-up

16.1 Power Float

If equipped, the Power Float mode can also be edited.

Resetting

Re-engages float when the joystick is returned to neutral.

Non-resetting

The button must be pushed to re-enable the float after the stick is deflected.

16.2 Function Labels

All the joystick button names and function will be preset by the factory. The joystick button names can be edited via the pull-down selection menus.

B1 is at the bottom left location and the buttons count up clockwise.
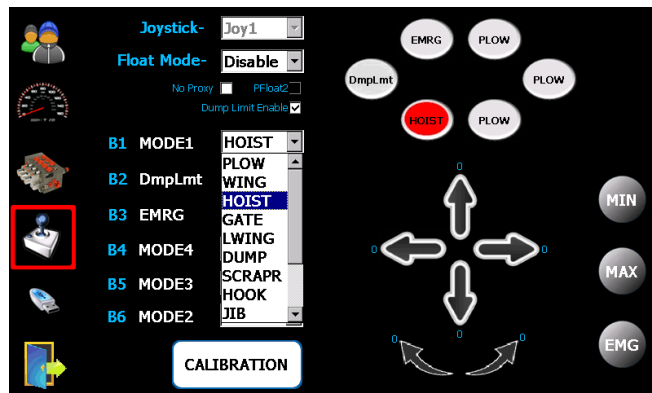
Note: Editing the names of the functions does not re-allocate the outputs on the valve cable. They are fixed and defined in the valve layout for the specific system.

17 Warning

This glass LCD touch screen display has been extensively tested and validated against its intended use. This glass could crack and break if the display is dropped on to a hard surface or receives substantial impact. If the glass chips or cracks, discontinue use and contact Bosch Rexroth Canada to have it replaced - do not

touch or attempt to remove the broken glass. Any misuse/abuse causing damage, whether intended or not, will become the sole responsibility of the owner/buyer which will render the warranty of this product, void.

Notes: